

Review 1 Instantaneous Rates of Change
 Average Rates of Change
 Relation between f & f'

Inst. Rates - derivative (at a point)
 $f'(a)$ with respect
 to time

Ave Rate : on an interval $[a, b]$

$$\frac{f(b) - f(a)}{b - a}$$
 not ave value

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example

position $x(t) = 3 + 7 \sin(\frac{\pi}{2}t)$

a) find the velocity function $\frac{\pi}{2} \cos(\frac{\pi}{2}t)$

b) find the inst. rate at $t=0$ & at $t=1$

c) find the average velocity on $[0, 1]$

$\frac{v(1) - v(0)}{1 - 0}$ ~~ave accel.~~ $\frac{x(1) - x(0)}{1 - 0} = \frac{(3+7) - (3)}{1 - 0} = 7$

$\frac{1}{1-0} \int_0^1 \frac{\pi}{2} \cos(\frac{\pi}{2}t) dt = \frac{x(t)}{1-0} \Big|_0^1$

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relation f & f'

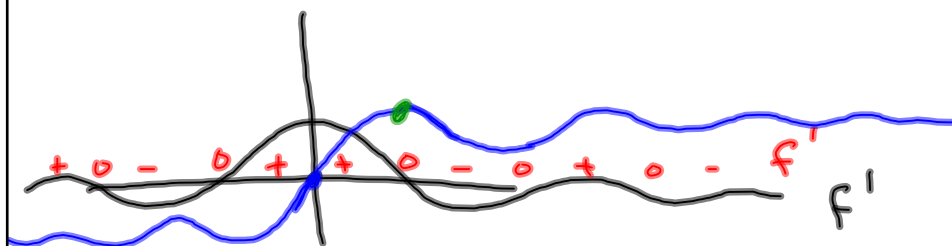
if $f' > 0$ then f increases

if $f' < 0$ then f decreases

if $f' = 0$ then f has a max or a min
or a flat point

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Ex. $f'(x) = \begin{cases} \frac{\sin x}{x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases}$



sketch a possible graph of f

$$\cancel{f(x)} = \int_0^x f'(t) dt = f(x) - f(0)$$

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